Babcock & Wilcox

a McDermott company

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7401 West Mansfield Avenue
Lakewood, CO 80235
(303) 988-8203

December 9, 1991

Mr. Jim Nelson
Intermountain Power Service Corp.
850 W. Brush Wellman Road
Route 1, Box 864
Delta, UT 84624-9546

RE: B&W Contract RB-615, Unit #2
Burners

Dear Jim:

You will find enclosed the photographs from my recent visit, as well as my report to Barberton. For the most part, this is self explanatory. In addition, I have enclosed data from some pulverizer response testing that I was involved in some years back. This is in reference to the comments concerning turndowns that I observed. This is for your info.

I did spend time observing oil fires only, and discussed with you some recirculation that was occurring. As such, I have highlighted some of the photos to help further identify this problem. I think it is worthy of further observation and action.

One final comment concerns the use of the superheater bypass valve. The intent of this valve is to automatically control drum pressure at a constant value. This would help control drum level during the start up as shrink and swell are very pressure dependent. I observed that the operators were having a very difficult time with this. I would like to discuss this with you on my next visit.

Please advise should you have comments.

Sincerely,

BABCOCK & WILCOX COMPANY

D. C. Langley
Regional Service Manager
Western Region

DCL:pm/429
w/attachments

Babcock & Wilcox
a McDermott company

To	C.A. PALMBERG, PROJECT MANAGEMENT BARBERTON
From	D.C. LANGLEY, REGIONAL SERVICE MANAGER WESTERN REGION
	BDS 663-8
Cust.	INTERMOUNTAIN POWER PROJECT DELTA, UTAH
File No. or Ref.	
Subj.	SITE VISIT
Date	DECEMBER 9, 1991

This letter to cover one customer and one subject only.

A site visit was conducted on December 5 and 6 to review burner performance with the recently installed MZ stabilizers. This was approximately the eighth start-up by IPSC as they are having turbine vibration problems. Upon arrival, the unit was shutdown for a turbine balance shot and to remove the screens from the reheat intercept valves. Initial experience, as related by IPSC personnel, with the burners was as follows:

1. On initial coal firing, a district flame front was formed two to three feet from the nozzle. Flame scanning was difficult.

2. Flame brightness was determined to be unacceptable. To improve brightness and also pull the flames back, the outer air registers were closed, and the spin vanes closed to add "pre-swirl", and thus increase overall burner swirl.

3. After adjustment, outer air registers were at approximately the same position as prior to shutdown. The swirl would be about the same, but outer air flow is not as the shrouds were adjusted during the air balancing. (Two air traverses were conducted by RJM and IPSC after the outage. Air flows with dampers wide open were all within 20% (± 10%)). It should be noted that burner delta P is believed to be 2" greater than before.

4. It was apparently acknowledged by RJM that the inner air swirl was not sufficient. Monro, however, was adamant that the spin vanes remain nearly straight through, even though closing the vanes had improved conditions. The contention was that the air proportions had been shifted, and this would be more properly done by adjusting the air control disks. As such, RJM generated a listing of new settings that varied ± 1" around 3". These settings were made prior to start up. Air door variations were 5" to 7" open; shroud openings are unknown.

On 12/5, firing was established at approximately 4:00 p.m. Five levels of lighters were used to warm the unit with indicated oil flow of 20,000 +lbs/hr. With cold air, furnace conditions were quite hazy and opacity approached 60%. Lighter fires were observed and photographed from various positions. Total indicated air flow was 40% with SCAD's at 25% open. Flame patterns are shown in Photos 1-1 through 2-2. In some instances, almost a "pancake" shape flame was observed. It was also noted that in some instances, a portion of the lighter flame was recirculating across the burner centerline into the nozzle and inner air zone. This would be consistent with the bluff body effect of the nozzle with no PA flow. Over a long period, this recirculation could be damaging. No other personnel were noted as observing furnace conditions.

At 150°F secondary air temp, coal firing was initiated with B pulverizer at approximately 20% feeder speed. The intent was to begin building pressure and temperature fur turbine roll, normally a four hour procedure. Flames were observed to be barely stable with two to four feet of coal stream from the nozzle. The lighter flame wrapped around the coal stream resulting in successful ignition. Please see Photos 2-3, 2-4 and 2-5. At this point, a short recess was taken for a Gold Room ribeye.

Upon return, the unit was nearly ready for turbine roll. At that time, B pulverizer was in service with lighters and all other oil firing had stopped. At 500 psi, a second elevation of lighters was started in preparation for turbine roll. The turbine was successfully rolled, synchronized and taken to minimum load, at which time the second pulverizer was started. After an hour or two, the unit was taken to 400 MWs for "turndowns". Observations and photographs were taken along the way and at 400 MWs. Conditions at 400 MWs were 5 to 6% indicated O_2 with 480° to 530° F air temperature. Photo 2-6 through about 3-3 were taken at this load, some with lighters, some without. The remainder were taken during turndowns. Please be advised of the following comments:

1. A well defined flame front was established about 18" to 24" from the coal nozzle. This flame front tended to "dance" somewhat, but certainly appeared stable. The fires were well out of the throats and off the walls.

2. About five feet from the nozzle, the flames are well developed, but much more "bushy" in nature. The flames appeared to be continually expanding the further they went from the walls, and were quite billowy in nature.

3. The overall turbulence and swirl were noticeably reduced from before. The flames appeared less energetic, but brightness is pretty much as before. (The exposure for the photographs is nearly the same as before, 1/500 sec., f8, ASA100, 4X ND filter).

4. Flame patterns were much more consistent from burner to burner than before. Also, prior to the installation, it was not uncommon to observe one to two ragged burners at this load.

5. During turndowns, the flame front could be moved back and forth with outer air adjustments. Adjustments were made to bring the flames to an estimated 12" to 18" from the nozzle to satisfy the flame scanners. Scanner adjustments were made as required by IPSC. The sensitivity to outer air adjustments has been reduced, as 4 to 6 notch changes could be made with the burners remaining stable.

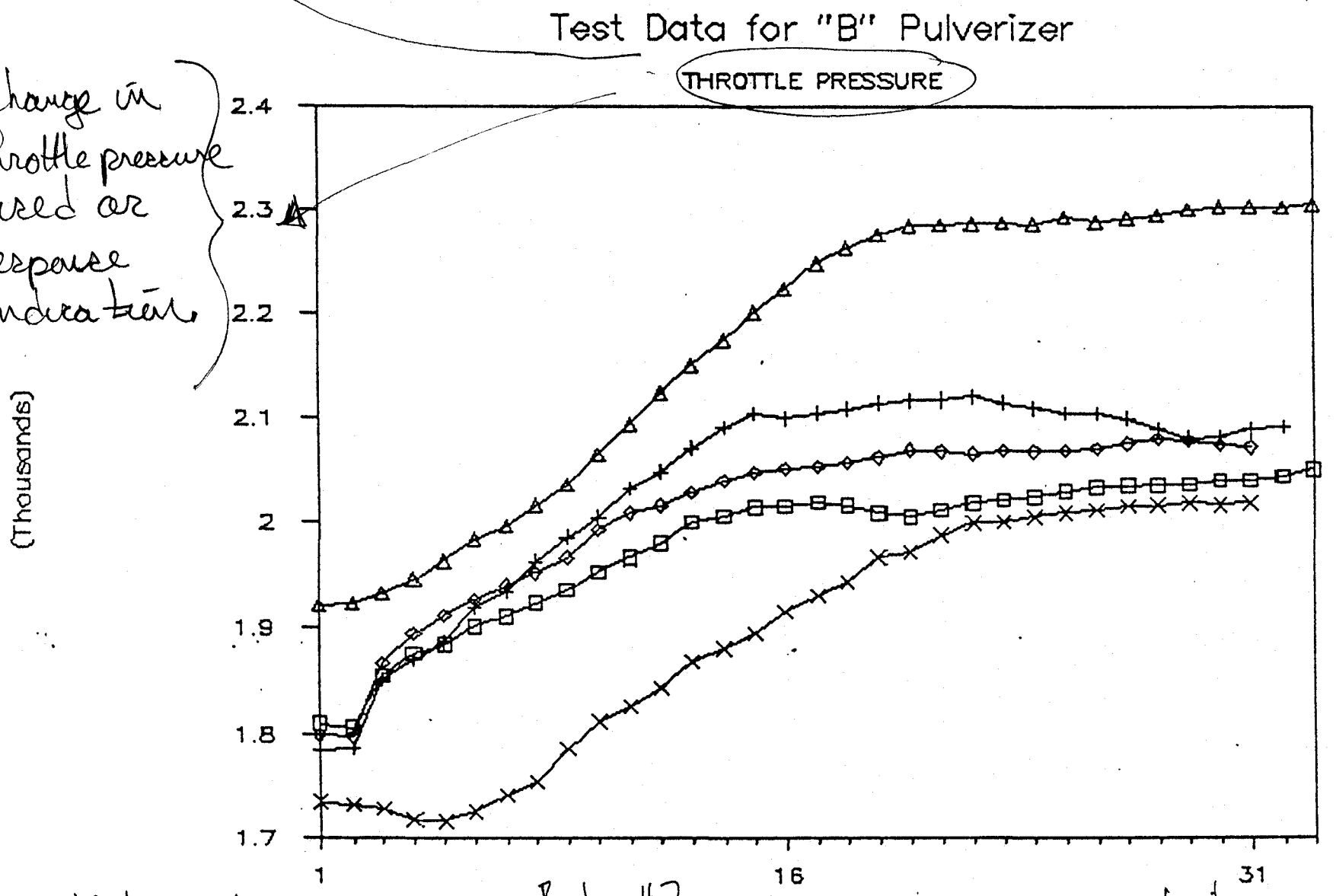
IPSC continued with turndowns through the night. This entailed varying fuel flow from 35% to 100% and observing conditions. IPSC reported that the fires tended to lay down at higher loadings, and bush out at lower feed rates. This was not personally observed. One problem with observations during the turndowns is insufficient time to stabilize the fires. It is well known that the time constant for step changes in firing rate for MPS mills is near 16 minutes, with as long as 25 minutes required for steady state conditions. Air flow reductions and increases are nearly instantaneous, resulting in hazy conditions (low air, high fuel), and laid down flames (high air, low fuel). This information will be relayed to IPSC.

On Friday a.m., a final visit was made to the site. The unit was operating at full load with high turbine vibration, and another shutdown was anticipated. A review of performance data showed NOx at 0.352 lb/mkb with an average 3.1% O_2, six mills in service. However, several O_2 analyzers were out of service, with ranges of in service analyzers from 5.6 to 2.3. Thus, the indicated O_2 is not reliable. No visual observations were made, and the site was vacated by B&W. A return visit will be made, as soon as reliable full load operation is achieved, to obtain performance data and observe furnace conditions.

Should you have comments, please advise.

DCL:pm/429
cc: P.L. Cioffi, Barberton
J.W. Smith, Barberton
E.L. Wells, Barberton
R.P. Hellebuyck, Denver
F.J. McGinley, Jr., Denver

• 10 to 20% step change in pulverizer demand.



Test Data for "B" Pulverizer